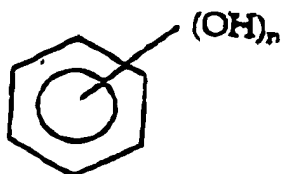


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AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listing, of claims in the application. Please make the following amendments to the claims:

1. (Amended) A chemical composition having oxygen transporting capability and comprising biocompatible hemoglobin oxygen transporting molecules chemically bonded to one or more biocompatible antioxidants selected from non-enzymatic phenolic compounds; pyrazolines; carotenoid and retinoid compounds; quinones; tetrapyrroles; indoles and aminoindoles; purine analogs; ascorbic acid; and steroid and alkaloid antioxidants.
2. (Original) The chemical composition of claim 1 wherein the antioxidant is a phenolic compound containing one or more groups of formula:

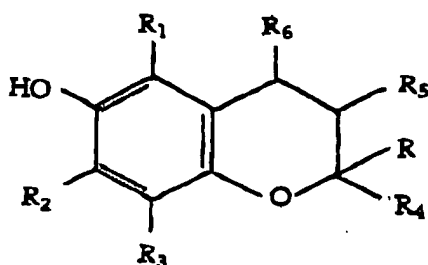


where n is an integer from 1 - 3, the aromatic ring being optionally further substituted, and being optionally fused or linked to another carbocyclic or heterocyclic ring system.

3. (Amended) The chemical composition of claim 2 wherein the phenolic compound is a polyphenolic, a substituted phenolic, a phenolic ether; a di-tert.butylhydroxyphenylthio-substituted hydroxamic acid; a chroman-based compound ~~such as a chromanol or a dihydrobenzofuranol~~; a flavanoid or isoflavanoid ~~such as flavanone and dihydroflavanol~~; a gallate; a catechol or catechol derivative; or a phenolic acid.
4. (New) The chemical composition of claim 3 wherein the phenolic compound is a chroman-based compound, selected from the group consisting of chromanol and dihydrobenzofuranol
5. (New) The chemical composition of claim 3 wherein the phenolic compound is a flavenoid or isoflavenoid selected from the group consisting of flavanone and dihydroflavanol.

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64. (Amended) The chemical composition of claim 43 wherein the phenolic antioxidant is a chromanol.
5. (Cancelled) ~~The chemical composition of any preceding claim wherein the oxygen transporting substance is a heme protein macromolecule.~~
6. (Cancelled) ~~The chemical composition of claim 5 wherein the heme protein macromolecule is a hemoglobin species.~~
7. (Amended) A chemical composition according to claim 1 consisting essentially of the reaction product of an oxygen transporting compound and a 6-hydroxy chroman compound having antioxidant properties and corresponding to the general formula:



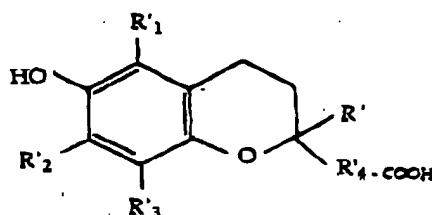
where each of R_1 , R_2 , and R_3 , is independently selected from H, $C_1 - C_8$ alkyl and $(CH_2)_n$ X where n is an integer from 0 to 20; each of R_4 , R_5 and R_6 is independently selected from H, $C_1 - C_{20}$ alkyl, X and $-(CH_2)_m$ X where m is an integer from 0 - 20; and X is a substituent containing a reactive functional group selected in conjunction with the chosen oxygen transporting compound so as to be capable of reaction therewith to effect chemical linkage of the oxygen transporting compound to the chroman compound; with the proviso that the chroman compound includes at least one functional group X.

8. (Amended) The chemical composition of claim 7 wherein ~~the oxygen transporting macromolecule is a heme protein macromolecule and the substituent X contains a functional group capable of reacting with amino acid residues of the protein chains of the heme protein macromolecule hemoglobin.~~
9. (Cancelled) ~~The composition of claim 8 wherein the heme protein macromolecule is a hemoglobin species.~~

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910. (Amended) The composition of claim 8 ~~or claim 9~~ wherein the substituent X contains a functional group selected from halo, carboxyl, amino, hydroxyl, thiol, azide, azo, aldehyde and phosphate.

101. (Amended) The composition of ~~any of claims 7, 8, 9 or 10~~ wherein the chroman compound is a chroman carboxylic acid corresponding to the general formula:



where R' is H or an alkyl radical of 1-20 carbon atoms and R₁, R₂ and R₃ are independently selected from H and C₁-C₄, alkyl, and R₄ is a direct bond or C₁-8 alkyl chain.

112. (Amended) The composition of claim ~~11~~ 10 wherein the composition is a covalently linked conjugate of said chroman compound and human hemoglobin,

123. (Amended) The composition of ~~any of claims 6, 9, 10, 11 or 12~~ claim 1 wherein the hemoglobin of the conjugate is modified by a cross-linking agent.

134. (Amended) The composition of claim ~~123~~ wherein the hemoglobin is at least partially stabilized by said cross-linking agent to form stabilized tetrameric units.

145. (Amended) The composition of ~~any of claim 5, 13, 6 and 9~~ ~~14~~ wherein the hemoglobin of the conjugate is at least partially oligomerized into oligomers of up to twelve stabilized tetrameric units.

156. (Amended) The composition of ~~any of claims 6 and 9~~ ~~15~~ 14 comprising a mixture of tetrameric stabilized hemoglobin units conjugated to the chroman carboxylic acid antioxidant and oligomers of from 2 - 8 such stabilized hemoglobin units conjugated to the chroman carboxylic acid antioxidant.

167. (Amended) The composition of ~~any of claims 13~~ ~~16~~ 15 wherein the hemoglobin is modified or cross-linked with a polyaldehyde, glutaraldehyde, a diaspirin compound, a pyridoxyl compound or a trimesoyl compound.

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178. (Amended) The composition of claim ~~167~~ wherein the hemoglobin is cross-linked with a polyaldehyde derived from oxidative ring-opening of a polysaccharide.
189. (Amended) The composition of claim ~~178~~ wherein the polysaccharide is raffinose.
- ~~1920.~~ (Amended) The composition of ~~any of claims 6 and 13-19-1~~ wherein the hemoglobin-antioxidant conjugate is bonded to a biocompatible polymer.
- ~~201.~~ (Amended) The composition of claim ~~1920~~ wherein the biocompatible polymer is polyethylene glycol, a polysaccharide, a polyamino acid, or an insoluble support.
- ~~212.~~ (Amended) The composition of claim ~~101~~ wherein, in the formula of the chroman carboxylic acid, at least one of R'_1 , R'_2 and R'_3 is methyl.
- ~~223.~~ (Amended) The composition of claim ~~212~~ wherein, in the formula of the chroman carboxylic acid, R_4 is a direct bond.
- ~~234.~~ (Amended) The composition of ~~any of claims 9-23, 22~~ wherein the chroman carboxylic acid antioxidant is 2,5,7,8-tetramethyl-2-carboxy-chroman-6-ol.
25. - 35 (withdrawn)
36. (New). The composition of claim 1 wherein the hemoglobin is human hemoglobin conjugated with trolox.
37. (New). The composition of claim 36 wherein the hemoglobin is intramolecularly cross-linked.
38. (New). The composition of claim 37 wherein the hemoglobin is intramolecularly crosslinked with O-raffinose.

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39. (New) The composition of claim 36 wherein the hemoglobin is intramolecularly and intermolecularly cross-linked.

40. (New) The composition of claim 36 wherein the hemoglobin is deoxyhemoglobin

41. (New) The composition of claim 36 wherein the hemoglobin is carboxyhemoglobin.

42. (New) The composition of claim 1 wherein the Hb: antioxidant ratio is 1:1 - 1:3.7.

43. (New) The composition of claim 1 wherein the P50 of the conjugate is 40.